

**REMARKS**

Claims 15, 17, 19, 21, 25, 27, 29, 31, 33, 35 and 37 are pending in this application.

By this Amendment, claims 15, 17, 19, 21, 25, 27, 35 and 37 are amended for clarity and claim 23 is canceled. Support for the "method for polishing a substrate" feature of claim 15 is found, for example, in original claim 23, p. 38, lines 10-19 and Examples 1 and 2. Support for the "disposed outward from a center" feature is found, for example, in Figs. 1-3 and 5, particularly Fig. 3. Support for the shapes of the substrate, pad and grooves is found, for example, in Figs. 2 and 5 and p. 34, lines 8-13. No new matter is added.

**I. Formal Matters**

In the Office Action, claims 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, and 35 are rejected under 35 U.S.C. §112, second paragraph. In particular, it is alleged that because the substrate is not positively recited, even if the substrate is of known size, the size and shape of the polishing pad and grooves are variable. Therefore, it is alleged that the scope of the claims is unascertainable. Applicant respectfully disagrees. This rejection is accordingly respectfully traversed.

Contrary to the assertion in the Office Action, groove size and pad shape are not variable in claims 15 and 27, but instead, for a known cross-sectional area of a given substrate must result in a total volume of grooves/area of substrate relationship meeting the claimed range of 0.06 to 0.23. That is, while different sizes, shapes and groove dimensions could meet this relationship, all are a collective range of values that meet the claimed relationship. Therefore, the scope is concise and definite.

Moreover, statements made in the preamble (or within the body of a claim) must be evaluated to determine whether any recited "use" results in a structural difference between the claimed invention and the prior art. If so, the recitation is deserving of patentable weight.

*See In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963), *In re Schreiber*, 128

F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997) and MPEP §2111.02. This has not been done. In this case, independent claim 27 clearly recites that the pad is used for polishing a particular substrate of a known cross-sectional area. Thus, because the substrate area of a substrate being polished is relevant to the groove volume/substrate area relationship and thus relevant to a structural property of the pad, this known and recited size of a substrate during use must be given patentable weight.

Nonetheless, to address the Examiner's comments, independent claim 15 is amended to be a method claim directed to polishing a circular substrate. Claim 15 now positively recites the substrate. Moreover, shapes are provided along with clarified definitions of the groove parts existing below the substrate in independent claims 15 and 27.

Thus, with reference to Fig. 3, for example, a substrate 11, such as a 300 mm wafer, of a known cross-sectional area (determinable by the area equation for a circle) is provided on a polishing pad 13 having a series of radial grooves. The claims are directed to an appreciation that there is a volume/area relationship that can attain suitable polishing properties.

For example, as set forth in Applicant's pg. 26, it has been found by Applicant that a particular relationship between total volumes of the radial grooves (in a portion of the polishing pad immediately below the substrate) and area of the substrate (wafer) exists that can result in improved polishing independent of the exact size of the substrate being polished. This relationship ensures that a proper amount of polishing agent is carried from a center of the pad through the grooves to enable polishing without generating flaws for any given substrate size.

Given the recited sizes, shapes and area, one can readily compute a range of values that meet the claimed volume/area relationship. Therefore, independent claims 15 and 27 and claims dependent therefrom are concise and definite. Withdrawal of the rejection is respectfully requested.

## II. The Pending Claims Define Patentable Subject Matter

In the Office Action, claims 15, 17, 23, 25, 27, 29, 35 and 37 are rejected under 35 U.S.C. §102(e) over newly applied U.S. Patent No. 6,783,436 to Muldowney. Additionally, claims 19, 21, 31 and 33 are rejected under 35 U.S.C. §103(a) over Muldowney. These rejections are respectfully traversed.

The Office Action merely alleges that Muldowney discloses a polishing pad 100 having radial pattern grooves 104 formed on surface 102 of the pad. However, there is no assertion that Muldowney meets the recited claim feature of independent claims 15 and 27 that the radial grooves have a specified total groove volume (in a portion of the polishing pad immediately below the substrate) relative to substrate area relationship that is in the range of 0.06 - 0.23. The cited passages of Muldowney are also silent as to any groove volumes, and Muldowney fails to recognize or appreciate the significance of total groove volume to achieving of improved polishing of the substrate and fails to appreciate the problem that a particular pad may work differently when used with a different sized substrate. Moreover, with respect to newly crafted independent method claim 15, nowhere is it taught to perform the specific method steps recited.

"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). *See also Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989). Moreover, as stated previously, statements made in the preamble (or within the body of a claim) must be evaluated to determine whether any recited "use" results in a structural difference between the claimed invention and the prior art. If so, the recitation is deserving of patentable weight. *See In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963), *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997) and MPEP §2111.02. This has not been done.

In order to anticipate a claim, each and every feature must be found in the cited reference. Because the Patent Office has failed to meet its burden and establish that the claimed volume/area relationship is necessarily met in Muldowney, anticipation of independent claims 15 or 27 and claims dependent therefrom has not been established.

Moreover, the Office Action alleges that the recited groove width would have been obvious since discovering optimum or workable ranges involves only routine skill. However, Muldowney fails to appreciate the relevance of total groove volume (in the portion of the polishing pad immediately below the substrate) to substrate area relationship to polishing of a substrate such as a wafer, and fails to recognize that a pad for one size of substrate may not work properly with another size. Thus, because there is no teaching of a result-effective variable (groove volume/substrate area relationship) in Muldowney, one of ordinary skill in the art would not have been led to determine an optimum value nor predictably achieve a desired result based on the Muldowney teachings.

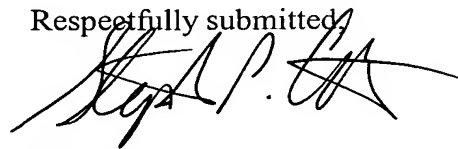
Thus, identification of a workable range would not have been "routine" as alleged because a parameter must first be recognized as a result-effective variable, i.e., a variable that achieves a recognized result, before the determination of the optimum or workable ranges of the variable may be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Because Muldowney does not appreciate the effect total groove volume relative to substrate area has on polishing, one of ordinary skill in the art would not have been led to optimize such a volume by groove width selection or the like to achieve a volume within the claimed range absent impermissible hindsight consideration of Applicants' disclosure. Accordingly, the subject matter of independent claims 15 and 27 and claims dependent therefrom also would not have been obvious in view of the teachings of Muldowney. Withdrawal of the rejections is respectfully requested.

**III. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 15, 17, 19, 21, 25, 27, 29, 31, 33, 35 and 37 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Date: March 3, 2009

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